Inc. 1910 Public Works

60 S Main St | PO Box 48 - Driggs, ID 83422 | Ph: 208-354-2362 | Fax: 208-354-8522 | www.driggsidaho.org

December 27, 2018
Updated July 30, 2019
Updated March 25, 2020

David Domingo
Ground Water Unit, U.S. EPA Region 10
1200 Sixth Avenue, Suite 155, OCE-201
Seattle, Washington 98101
Via email: domingo.david@epa.gov

RE: City of Driggs Update: CWA-10-2018-0206

Dear Mr. Domingo,

The following letter summarizes activities the City of Driggs has undertaken to bring the Teton Valley Regional Wastewater Reclamation Facility into compliance. Some of these actions took place before the consent order was finalized, but are part of the City's efforts to achieve compliance and I believe are critical to resolving the issues at out wastewater treatment plant. Unfortunately, it appears we are not currently in compliance, based on our internal testing, and may not meet the consent order deadline.

In summary we have spent the past 2+ years testing our influent, effluent and performance of the wastewater treatment plant. This testing, through the various seasons, have identified two stretches which the plant has not meet our compliance levels for ammonia; mid-winter and early summer. Additionally, we've contracted with outside laboratories to analyze our influent, effluent, and lagoons along with hiring consultants to test our collection system for anomalies.

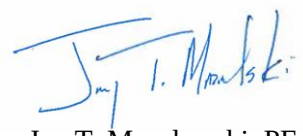
Since the last update; the city has been working with multiple engineers and wastewater professionals in an attempt to a) fixed the existing plant and b) design/implement an alternative solution if the existing plant cannot be fixed. We have undertaken the following measures for;

A) Fix the existing plant
   a. Hired an BYU student, under the direction of the WWTP Designer for the month of August to test our influent throughout the collection system looking for toxic or anomalous influent. No conclusive results came from this testing.
   b. Hired two staff members dedicated to the WWTP, bringing our WWTP staffing up from 1 to 2.5 employees.
   c. Installed a recycle/RAS pump to help recycle the biology and increase the number of nitrifiers in the system.
   d. Re-installed the tank heaters in an attempt to increase the water temperatures.
   e. Investigated the source of cold-water influent in winters, unfortunately this is a system wide issues (typical temp is approximately 42F)
   f. Contracted with a wastewater professional to conduct an on-site evaluation of the plant and operations (see attached report)
   g. Covered the west basin with insulated blankets to increase the water temperatures.
   h. Continued to work with the design engineer to troubleshoot the ammonia issue.

B) Design/Implement alternative solution
    a. Received updated flow/loading projections for the WWTP showing the plant will be at capacity in the next 3-5 years. Facilities engineer recommends combining plant expansion and process change (MBR) to meet compliance order.
    b. Reviewed potential plant additions to achieve compliance with DEQ, plant designer, facilities plant engineer, and staff (see attached minutes). Current no viable plant addition was found.

The attached timeline provides a brief synopsis of our actions from the past 2+ years. I would be happy to provide additional information regarding any of the items below.

Signed,



Jay T. Mazalewski, PE
Director of Public Works

TIMELINE:

<u>September 2017:</u>

City began testing ammonia levels daily at the headworks and the outfall of the east and west treatment trains.

City contracted with Roberts Consulting to perform inhibition testing on our influent stream for 2 weeks. Tests were taken at two major collection points and the headworks of the treatment plant. Individual samples were taken hourly at these locations. Only two of the tests showed any inhibition. There does not appear to be a regular toxic constituent in our influent stream based on these results.

City began seeding the east train with liquid nitrifiers (MircoPlex NC). East train began nitrifying and met compliance levels within a week.

<u>October 2017:</u>

Reduced testing to M, W, F continued to seed 0.5lbs of Microplex NC to the east train.

City began seeding the west train with liquid nitrifiers (MircoPlex NC). West train began nitrifying and met compliance levels in about 10 days.

Lost nitrification in the west train when flows from the lagoons were added to the west train. East train continued to nitrify.

<u>November 2017:</u>

Reduced seeding Microplex NC to the east train to 0.5lbs on Monday and Friday.

East train continued to nitrify, no nitrification in the west train.

<u>December 2017:</u>

Continued to test ammonia levels, and started testing COD, and nitrates levels on M, W, F.

Continued to seed Microplex NC to the east train to 0.5lbs on Monday and Friday..

Began seeding the west train daily with BioWish Aqua as part of pilot project with the manufacturer.

East train continued to completely nitrify, no nitrification in the west train.

January 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Wastewater temperatures in the plant dropped below 8 degrees C.

East train continued to nitrify, but not to compliance levels. No nitrification in the west train.

Increased seeding amounts of MicroPlex to the east train, with no increase of ammonia reduction. East train removed about 50% of the ammonia.

Continued to seed the west train with BioWish Aqua. No ammonia removal seen in the west train.

Began researching temperature effects on nitrifying bacteria. Spoke with other cold weather operations and operators.

February 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F. Water temperatures fall below 7 degrees C and occasionally below 5 degrees C.

Reduced seeding Microplex NC to the east train to 0.5lbs on Monday and Friday. Continued daily seeding of Biowish Aqua in the west train.

East train continued to nitrify approximately 50% of the ammonia, but not to compliance levels. No nitrification in the west train.

Tested each cell of the east train to determine the location of nitrifying bacteria.

Began an experiment attempting to increase the water temperatures. Installed four temporary 1KW heaters for 36hrs in the east train cell 10, where it appeared nitrification was starting. Within 24 hours no ammonia was detected in the east train. East train continued to completely nitrify for 11 days.

Shipped a sample of our influent to BioWish manufacturing for testing. Results showed BioWish nitrifiers would not establish at temperatures below 8 degrees C.

March 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F. Water temperatures consistently below 7 degrees C and regularly below 6 degrees C.

Continued seeding Microplex NC to the east train to 0.5lbs on Monday and Friday. No seeding of the west train.

Repeated the experiment to attempt to increase the water temperatures. Installed four temporary 1KW heaters for 24hrs in the east train cell 10. Within 24 hours no ammonia was detected in the east train. East train continued to completely nitrify for 2 days. The 1KW heaters were run from generators as there is not adequate power infrastructure at the trains to keep them running full time.

Researched and contacted companies about methods to heat wastewater. Began running cost benefit analysis of different heating technologies.

April 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F. Water temperatures consistently above 7 degrees C and regularly above 8 degrees C.

Stopped seeding the east train, began seeding BioWish the west train.

East train completely nitrifying, no nitrification in the west train.

Equipment issues affect operations and testing for two weeks.

Compliance and Consent order issued and finalized.

May 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F. Water temperatures consistently above 10 degrees C and regularly above 12 degrees C.

No seeding in the east train, continued seeding Biowish Aqua in the west train.

East train completely nitrifying, no nitrification in the west train.

Equipment issues again affect operations and testing for two weeks.

Updated software to track east and west train temperatures (4 locations, 2 each train)

June 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

No seeding in the east train, restarted Biowish Aqua seeding in the west train.

East train completely nitrifying, no nitrification in the west train.

Flows dramatically increased to the WWTP, irrigation canals running and groundwater elevations are up contributing to I/I. Retention time reduced to less than 1 day.

Began looking for inflow/infiltration sources. Found 2 sump pumps discharging, 4 broken sewer services and multiple MH's with serious infiltrations.

Received conditional award of Idaho DEQ wastewater facilities planning grant.

End of June east train only removing 60% of ammonia.

July 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

No nitrification occurring in east or west trains.

Started seeding the east train with MicroPlex, continued seeding Biowish in the west train.

2nd week of July city hired a contractor to seal 6 MH's and fixed 3 broken services. Flows dropped by 20% to the WWTP.

Continued search for I/I sources, retention time still under 1 day.

Sent lagoon water samples to microbiology lab to determine if lagoon water was toxic to the nitrifying bacteria. Results came back negative and lagoon water was determined to be healthy.

August 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

No nitrification occurring in east or west trains at the start of the month, by late August east train was completely nitrifying.

Increased seeding the east train with MicroPlex, stopped seeding Biowish in the west train.

Flows decreased, retention time increased to over one day.

September 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Continued seeding Microplex NC to the east train to 0.5lbs on Monday and Friday. No seeding of the west train.

Began pumping lagoon water through both sides, no negative effects.

East train completely nitrifying. West train began nitrifying without seed, but not to compliance levels.

October 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Continued seeding Microplex NC to the east train to 0.5lbs on Monday and Friday. Started seeding Microplex NC to the west train.

East & west trains completely nitrifying.

Aquarius Technologies believes a latent toxin may be in sludge accumulated in each cell. PW Staff took 36 sludge samples from the basins and sent to Pace Analytical labs for toxicity analysis.

Finalized order for two 12KW over the side tank heaters. One heater will be installed in cell 10 of the east and west train. Heater can be controlled by the SCADA (telemetry system). They are designed to be removed in the summer months when water temperatures are higher.

November 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Continued seeding Microplex NC to the east and west train on Monday and Friday.

East & west trains completely nitrifying.

Retention time approximately 2-day, water temperatures above 10 degrees C.

Received sludge testing results, some issues identified with toxic accumulation further review needed.

Issued RFQ for engineering services related to wastewater planning grant. Grant will fund a study of the plant for capacity, ammonia issues, operation issues and study our collection system for I/I issues and other potential toxic/ammonia sources.

December 2018:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Started seeding Microplex NC to the east and west train on M-F.

East & west trains completely nitrifying for the beginning of the month. East only nitrifying 50% by the end of the month. West continued to nitrify all month.

12KW heater delivery delayed, plan on first week of January for installation.

Effluent temperature dropped below 9 degrees C, basin temperatures dropped below 8 degrees C. Temperature drop coincides with loss of nitrification in the east train.

January 2019:

12KW heaters installed and west basin heater turned on January 16 in an attempt to raise the water temperature. Initial improvement in ammonia reduction in the west basin was observed, however water temperatures only rose 0.5 C to about 7.5C then droped to 6.5C with colder influent water.

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Seeding Microplex NC to the west train on Monday through Friday to try and restart nitrification.

Lost nitrification to compliance levels in both trains on January 5th. West basin is still removing approximately 50% of ammonia with the heater on, East train is not removing any ammonia.

February 2019:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Seeding Microplex NC to the west train on Monday through Friday to try and restart nitrification.

Influent water temperatures drop to below 6C and hover between 5C and 6C. East train temperature is typically the same as influent temperature. West train temperature is approximately 0.5C higher than influent temperature.

February 21, contracted electrician moves both 12KW heaters into the west train to try and raise temperature and re-start nitrification. Seeded the west train with additional MicroPlex NC. Stoped seeding east side due to lack of response.

West basin temperature in approximately 1C higher than the east (mid 6C vs mid 5C). Heaters moved to various heights in the water column in an attempt to maximize heat/biological activity.

March 2019:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Seeding Microplex NC to the west train Monday through Friday to try and restart nitrification.

Influent water temperatures stay below 6C and hover between 5C and 6C.

West basin temperature is approximately 1C-1.5C higher than the east (mid 7C vs mid 5C). West train begins nitrifying, however still not to compliance level consistently.

April 2019:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Seeding Microplex NC to the west train Monday through Friday to restart nitrification.

Influent water temperatures stay below 6C but start to rise as the month progresses.

Lose nitrification in the west train, temperatures drop to match east train. Heaters were turned off and not turned back on for approximately 1-week. This was an operational error and daily procedures now include checking heaters.

April 3-5, due to lack of nitrification and increased lagoon levels, lagoon pump turned on and lagoon levels reduced. Basin temperatures are reduced to below 5C due to cold lagoon water.

West train heater turned on and reseeding started again in late April. West train temperatures above 8C and 1C-1.5C higher than East train.

May 2019:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Seeding Microplex NC to the west train Monday through Friday to restart nitrification.

No nitrification occurring in either train.

West train temperatures rising and around 10.5C. East train temperatures around 9.5C.

Reuse water pipe broke to a washpactor, plant shut down, and all influent directed to the lagoons for 3-days (no discharge from the WWTP during these days, all water stored in the lagoons). Plant restarted on June 1.

June 2019:

Plant restarted on June 1. Lagoon pumps turned on to reduce lagoon levels due to diversion of influent.

Significant flow increases due to I/I. City staff identified 3 broken/cracked service lines, 6 leaking manholes. Homeowners notified that service lines must be repaired, contractor scheduled to seal manholes.

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Seeding Microplex NC to the west train Monday through Friday to restart nitrification.

No nitrification occurring in either train.

West train temperatures around 10.5C. East train temperatures around 9.5C. The lack of water temperature increase may be due to the volume of cold groundwater entering the system (I/I).

West train nitrifying about 50%, no nitrification in the east train.

Met with City Attorney, Mayor, PW Director, WWTP Operator, WWTP Design Engineer to discuss next steps, design timeline, construction timeline and options to ensure compliance by April 2020.

July 2019:

Continued to test ammonia, COD, and nitrates levels on M, W, F.

Seeding Microplex NC to the west train Monday through Friday to restart nitrification.

Influent flow higher than normal due to I/I. City staff plugged/seal 3 manhole stubs. Flow starting to decrease at the end of the month

25-50% nitrification occurring in each train.

PH meter at discharge malfunctioned, recalibrated and checked and alkalinity (CaCO3) is available to ensure nitrification possible.

Both train temperatures rising and around to 14C and above.

Continued to meet and coordinate with City Attorney, Mayor, PW Director, WWTP Operator, WWTP Design Engineer to discuss next steps, design timeline, construction timeline and options to ensure compliance by April 2020.

Public Works employee responsible for day to day operations at the treatment plant was terminated from the city, responsible charge operator (Jared) involvement increased. Staffing was re-organized to ensure maintenance continued. Positions for new operator and replacement responsible charge operator advertised nationally.

August 2019:

Engineering intern from BYU-Idaho was hired to perform in-house testing and collection system testing at the recommendation and under the direction of Scott Rogers from Aqua Engineering. The intern tested 4-6 days per week at the WWTP and collection system looking for anomalies in the waste stream. No conclusive results were found.

Seeding Microplex NC to the west train Monday through Friday to restart nitrification with no results. Seeding was stopped due to lack of response.

25-50% nitrification occurring in each train.

Both train temperatures rising and around to 15C and above.

Contractor attempted to seal MH's but could not as groundwater had receded earlier than normal due to a dry summer. Rescheduled for early June 2020.

Preliminary plant capacities and growth projections were received from Forsgren Engineering (WWTP Facility Plan). Projections showed the plant was approaching capacity in the next 2-5 years for loading and may be exceeding capacity for flows during certain the summer months now.

Process control engineer/Operator-in-training (Wes Vann) hired to work at the WWTP, starting in early September.

8/23/2019 meeting with the City, Forsgren, Aqua, and IDEQ to brainstorm next steps for achieving compliance. See attached agenda and meeting minutes.

Continued to meet and coordinate with City Attorney, Mayor, PW Director, WWTP Operator, WWTP Design Engineer to discuss next steps, design timeline, construction timeline and options to ensure compliance by April 2020.

September 2019:

Engineering intern from BYU-Idaho finished testing and returned to school. No conclusive results regarding illegal discharges or toxic influent were found.

60%-80% nitrification occurring in each train and improving during the month. No seeding was done at this time

Both train temperatures around 15C-16C.

Level III Operator (Toney Roy) hired from Washington State and scheduled to begin in October. WWTP will have 2 full time employees on-site starting in October. 6-10 month transition plan for the Toney Roy to become the responsible charge operator and take over for Jared.

Forsgren and Aqua submitted cost estimates and analysis for their recommended ammonia solutions (break-point chlorination & Ozonation), both solutions had significantly more cost and operational issues than initially presented and therefor not believed to be feasible.

Continued to meet and coordinate with City Attorney, Mayor, PW Director, WWTP Operator, WWTP Design Engineer to discuss next steps, design timeline, construction timeline and options to ensure compliance by April 2020.

October 2019:

Two full staff members now dedicated to the WWTP. Regular testing of influent, effluent resumes. TSS in-house testing added.

Full ammonia removal is achieved throughout the month. No seeding occurred; no major operational changes were implemented.

Both train temperatures started the month around 15C and began to drop to 10C

Draft facility plan submitted by Forsgren. Preliminary plans call for plant expansion and process change away from fixed film.

Continued to meet and coordinate with City Attorney, Mayor, PW Director, WWTP Operator, WWTP Design Engineer to discuss next steps, design timeline, construction timeline and options to ensure compliance by April 2020.

November 2019:

Full ammonia removal is achieved throughout the month. No seeding occurred; no major operational changes were implemented. Temperatures still to falling but still seeing ammonia removal.

Over the tank heaters installed last year failed but under warranty. New heaters being sent by the manufacturer due in late December.

West basin covered with concrete blankets in an attempted to retain heat.

Lagoons were full and needed to be drawn down. Lagoon pump was turned on and run for two days. Basin temperatures dropped to 6.7C and full nitrification was lost (only 75% removal). Lagoon pumps were turned off, temperatures rose, and full ammonia removal returned within two days.

Continued to coordinate/brainstorm with WWTP design engineer and Facilities Plan engineer on solutions and mitigation measures.

December 2019:

Regular testing continued, TSS added to in-house testing. Full ammonia removal lost and by the end of the month only removing 30% of the ammonia.

Over the tank heaters re-installed, however no change in ammonia removal was seen.

Continued to coordinate/brainstorm with WWTP design engineer and Facilities Plan engineer on solutions and mitigation measures.

January 2020:

Regular testing continued. Full ammonia removal lost and by the end of the month no ammonia removal was occurring.

Operational issues with the Drum Screens, Huber Step Screens and Nova Fine Screens consumed the majority of time of the two WWTP operators.

Re-installed the recycle/RAS pump in an attempt to recycle the biology.

Forsgren Facility plan was reviewed and presented to the City Council. Additional information regarding current loading and projection were requested. A higher level of confidence in the projections is required by the city before moving ahead with a $10-$12 million expansion/retrofit.

Continued to coordinate/brainstorm with WWTP design engineer and Facilities Plan engineer on solutions and mitigation measures.

February 2020:

Regular testing continued. No ammonia removal was occurring but WWTP was in compliance with all other permit limits.

Forsgren Facility plan was reviewed by WWTP designer with specific comments and recommendations. City to work with WWTP designer to implement pre-treatment program.

Continued to coordinate/brainstorm with WWTP design engineer and Facilities Plan engineer on solutions and mitigation measures.

March 2020:

Regular testing continued, TSS added to in-house testing. No ammonia removal was occurring but WWTP was in compliance with all other permit limits.

Paul Krauth, PE as wastewater professional performed a 2-day, on-site review of the plant and operations to help determine process issues and potential solutions (see attached report).

Over the tank heaters turned off as no improvement was shown with these in operation.

Continued to coordinate/brainstorm with WWTP design engineer and Facilities Plan engineer on solutions and mitigation measures.

Inc. 1910 Public Works

60 S Main St | PO Box 48 - Driggs, ID 83422 | Ph: 208-354-2362 | Fax: 208-354-8522 | www.driggsidaho.org

AGENDA
Driggs WWTP – Ammonia Removal Options
235 South 5th Street, Driggs ID
8/23/2019 10:00am

The purpose of this meeting is to identify and assess potential technologies to bring the WWTP into compliance for ammonia.

Compliance Goal: Average Monthly Limit=0.84, Max Daily Limit=1.68
Typical Influent: Varies between 12-35 (depending on the time of year)

Technology Requirements:

1. Achieve the compliance goals, year-round.
2. Must be operational by April 1, 2020
3. Sized for our current summer peak daily flows (1.3 MGD+/-)

Additional Criteria/ Decision Making Factors:

1. Capital Costs
2. Operation Costs
    a. Manpower
    b. Electricity/propane
    c. Other
3. Expandability
4. Start-up/Shut down time
5. Permitting
6. Additional constituent removal benefits
7. Effect on WWTP classification level (currently a high 2)
8. Other criteria…

Technologies:

1. Purammon
2. Ozone
3. Break-point chlorination
4. Quick Wash – Renewable Nutrients
5. Other proven tech?
6. Other tech?

Meeting Summary
Driggs WWTP – Ammonia Removal Options
235 South 5th Street, Driggs ID
8/23/2019 10:00am-12:30pm

Attendees: Jay Mazalewski (City of Driggs), Jared Gunderson (City of Driggs), Willie Teuscher (DEQ), Greg Eager (DEQ), Scott Rogers (Aqua Engineering), Dave Noel (Forsgren Associates), Kevin Harris (Forsgren Associates), Jason Broome (Forsgren Associates)

Meeting Summary:
Jay M. gave brief summary of the meeting goals, reviewed the agenda and reiterated that the group would be focused on finding a technology that would bring the plant into compliance by April of 2020 and not attempting to troubleshoot the plant operations.

Willie T. suggested that the "permitting" criteria be changed to "approval" as DEQ will need to approve the technology, not permit it.

Dave N. suggested that timing be added to the criteria.

Dave N. discussed rapid rate oxidation options; break point chlorination vs ozonation. The group agreed that both types of oxidation should work and should meet all the identified criteria.

> Ozonation will have a higher capital cost and operational cost due to electrical usage, it may also eliminate need for the UV as it acts as a disinfectant. The process can be turned off/on as needed if the biological plant failed. Dave N. thought a wall mount unit should suffice. The estimated capital cost was between $100K-$400K. Willie T. stated that a minimum 1-month pilot will be needed along with backup documentation showing this technology is used successfully elsewhere. The group determined this is a viable option.
>
> Break point chlorination will have a lower capital cost and maybe a lower operational cost, it may also eliminate need for the UV as it acts as a disinfectant. De-chlorination will be required. Jared G. was concerned about the operational/operator safety and potential permit violation with the use of chlorine. On-site chlorine generation, liquid chlorine, and gas chlorine options were discussed. Jay M. expressed concern regarding the effectiveness/amount of chlorine needed for the cold water (5C). No estimated capital costs were discussed. Willie T stated that a minimum 1-month pilot will be needed along with backup documentation showing this technology is used successfully elsewhere. The pilot could be modified to simulate cold water events. The group determined this is a viable option.

Scott R. discussed Quick Wash Renewable Nutrients, also known as gas permeable membrane. This technology will recover the ammonia into a usable product (fertilizer). Based on our loadings the amount of product produced will be minimal. This is newer technology and typically used for high ammonia loading (industrial). Willie T. stated this will need a longer pilot time (3-months) in order for DEQ to approve. Costs were estimated to be in $2-$4 million range. The group determined this may be viable option, but not preferred due to cost and timing.

Ammonia striping towers were discussed, but determined not to be viable to due low air/water temperatures.

Scott R. discussed MicroVi Technology, a targeted biological system that can remove ammonia. Jay M. expressed concerns regarding temperature and toxicity compatibility. This is newer technology and typically used for high ammonia loadings (industrial). Willie T. stated this will need a longer pilot time (3-months) in order for DEQ to approve. No capital costs were estimated. The group determined this was not a viable option.

Scott R. discussed Ferric chloride and electric coagulation; however, these were determined to be operation changes to the plant and not relevant to this meeting.

Jay M. discussed Purammon's Ion Exchange technology. The technology was piloted in the Driggs lab (3 day) in 2017 and was successful. Scott R. expressed concerns regarding capital costs, licensing costs and flow equalization (Scott estimated $1.5 Million vs $900K). This is newer technology and just being piloted in Milwaukee. Willie T. stated this will need a longer pilot time (3-months) in order for DEQ to approve. The group determined this may be viable option, but not preferred due to cost and timing.

Jay M. discussed High Desert H2O (Ted Seaton) technology. Ted has run multiple tests/samples of the Driggs effluent but has yet to meet compliance levels. The technology/process is unknown. No capital costs or operation costs are known. Willie T. stated this will need a longer pilot time (3-months) in order for DEQ to approve. The group determined this was not a viable option as there is not enough information available.

Dave N. discussed relocating the treatment plant discharge location to the Teton River. This solution will increase the mixing zone, thereby increasing discharge limits. All agreed this is a good solution, especially for the long term. Jay M. discussed potential political and public opposition. Early engagement was identified to be critical for this solution. Discharge routing will follow Bates Road to the river. Jay M. inquired what the estimated ammonia discharge limits will be, Willie T. guessed between 4-8 mg/l. The group determined this is a long-term solution to pursue based on the City's growth, but will not ensure compliance, therefore is a not a viable solution at this time.

Dave N./Scott R. discussed using the Huntsman Golf Course ponds as a re-use or relocated discharge location. More information is needed to address this option including; discharge location, pond leakage, irrigation usage, and owner approval. The group determined this is a long-term solution to pursue but will not ensure compliance, therefore is a not a viable solution at this time.

Willie T. inquired about redundancy for any system installed. Jay M. requested that the chosen system be considered the redundant system as the biological plant should be the primary mechanism to remove ammonia.

Conclusions:

Forsgren will include the options discussed in the facility plan update. A copy of the meeting summary will be sent to all parties, EPA, and included with the next DMR. Jay M. will meet with the Mayor and Jared G. on Wednesday to discuss the next step.

The group reviewed all the options and concurred that the rapid rate oxidation process was the best option to pursue. The group debated merits and drawbacks of each type:

Break point chlorination:

- Pro: lower capital cost
- Pro: lower operational cost
- Con: Operator safety with chlorine
- Con: Potential for permit violation if de-chlorination is not calibrated
- Con: Additional staffing/monitoring

Ozonation:

- Pro: Ease of automation
- Pro: No additional chemicals needed
- Pro: No need to remove/treat the effluent after ozonation
- Con: Higher capital cost
- Con: Higher operational cost (electrical)

8/29/2019 City Update:

On 8/28/2019 The City of Driggs directed Aqua Engineering, via Scott R. to:

Please put together a conceptual proposal/plan for installing break-point-chlorination at the Driggs WWTP to meet our ammonia discharge limits. Attached is the past two years of in-house testing data that show flows, influent ammonia levels. pH, temperature, etc. The plan/proposal should include:

1. *Conceptual layout*
2. *Capital cost, including installation, equipment, automation, new structures, etc.*
3. *Annual operating cost, forecasted over 5-years. Please include any required chemicals (chlorine, pH adjusters, dichlorination, etc), power consumption, and additional anticipated manpower hours.*
4. *Installation of a pilot plant to run for 30 day, including the ability to adjust influent temperature to mimic winter conditions.*

I will need this by 12pm, Monday September 16.

On 8/28/2019 The City of Driggs directed Forsgren Associates, via Kevin H./Dave N. to:

Please put together a conceptual proposal/plan for installing ozonation at the Driggs WWTP to meet our ammonia discharge limits. Attached is the past two years of in-house testing data that show flows, influent ammonia levels. pH, temperature, etc. The plan/proposal should include:

1. *Conceptual layout*
2. *Capital cost, including installation, equipment, automation, new structures, etc.*

3. *Annual operating cost, forecasted over 5-years. Please include any required chemicals (pH adjusters, etc), power consumption, and additional anticipated manpower hours.*
4. *Installation of a pilot plant to run for 30 day, including the ability to adjust influent temperature to mimic winter conditions.*

I will need this by 12pm, Monday September 16.

Statepoint Engineering
Wastewater Processes
Evaluation & Training

TECHNICAL MEMORANDUM

TO: Jay T. Mazalewski, PE
Director of Public Works
City of Driggs

Tony Roy
City of Driggs

Wes Vann
City of Driggs

FROM: Paul Krauth, PE
Statepoint Engineering

DATE: March 26, 2020

SUBJECT: Results from on-site visit of both the facility and laboratory

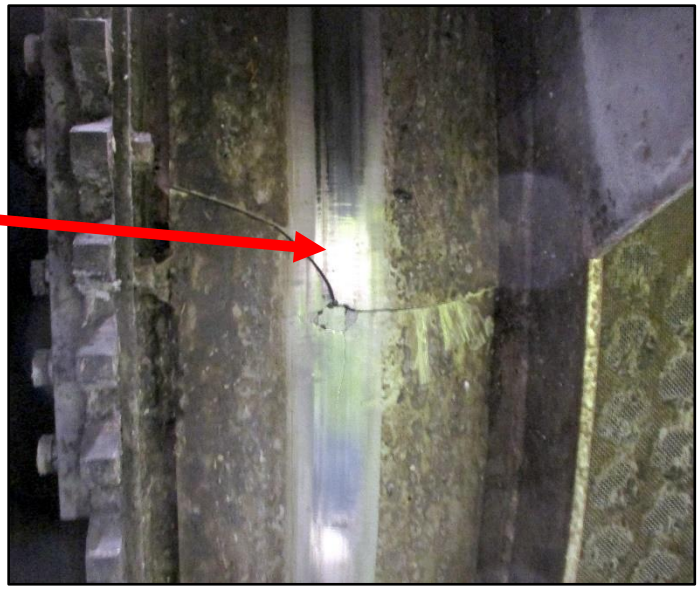
On March 4-5,2002 Tony Roy, Wes Vann and myself conducted on-site inspection of both the City of Driggs, wastewater facility and the City's laboratory located at the city shops. Here is my initial impression of the system. I broke these down into three categories, physical condition, biologic and chemical health and laboratory procedures.

Physical Condition

The first and most pressing issue is that not all the facility's units are in working order. At the time of my visit, it was my understanding the following processes were down

1. The influent step screen was experiencing issues and was frequently bypassing
2. One of the drum screens had physical cracking in the drum, leading to one out of service and requiring the remaining screen to handle any hydraulic surges without a backup.
3. The effluent disc filter was out of service
4. The reliability of both the pH and DO in-situ probes were questionable, lacking calibration records.

Drive Rim of the out of service drum screen, Note structural failure



While the current drum screen in service can handle the current flows, the lack redundancy is concerning. Any bypassing will result in an accumulation of inorganic solids in the aeration.

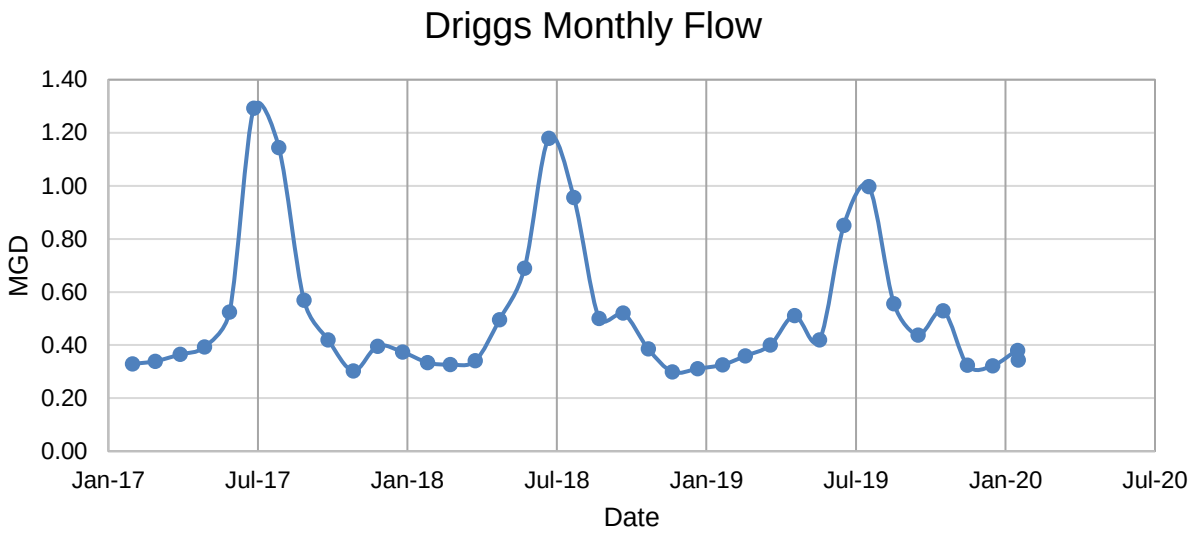
The out of service fine screen

The solids removal process is designed to use both the plate settler and fine screens. Having the later out of service compromises the solids removal. While the overall TSS in the effluent is well in compliance. The opportunity to recycle any biomass that might have sluffed off in the MSABP basin (and the associated nitrifying bacteria) is lose without these screens in operation

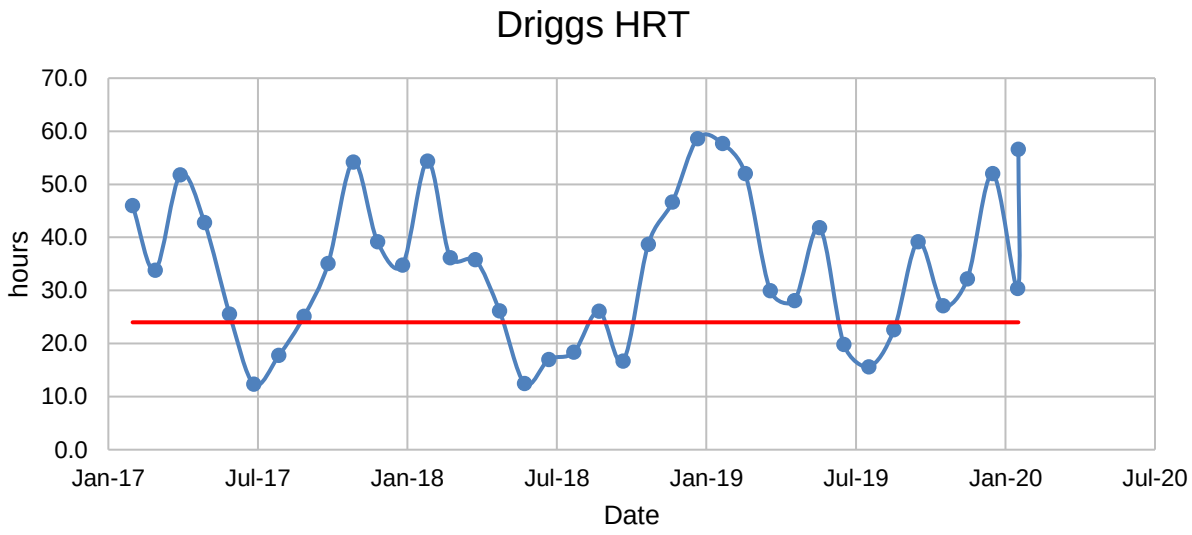
Biologic and Chemical Health

I review the Driggs DMR data from 2017 to present

The easiest way to review and evaluate this data is graphically

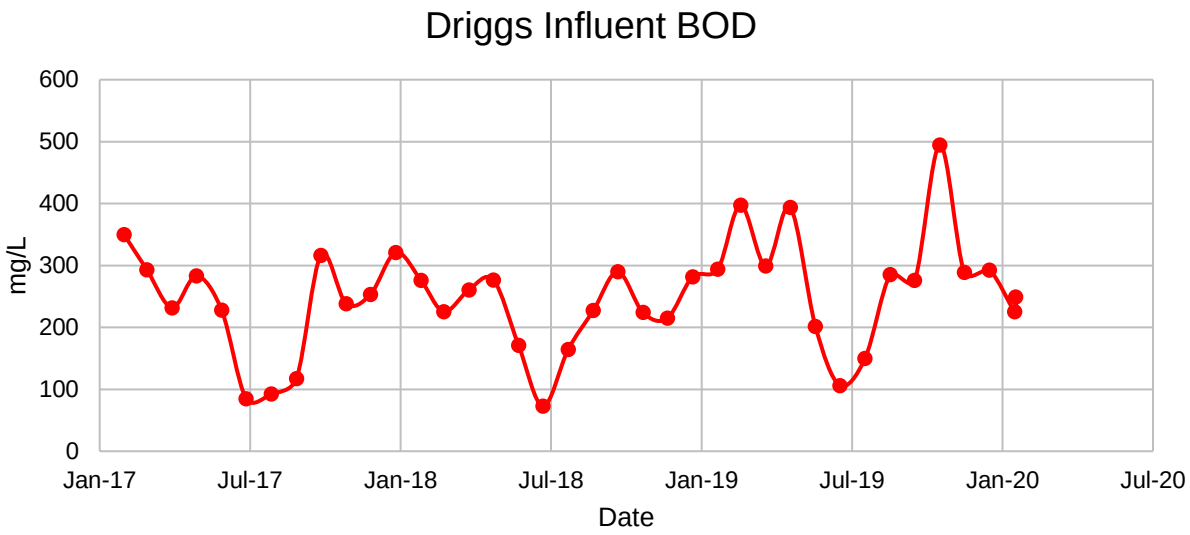


The summer peaks are obvious, is there any possibility that the old lagoons could be used as equalization basins on a routine basis? These high of peaks will scour the biomass attached in the MSABP basins

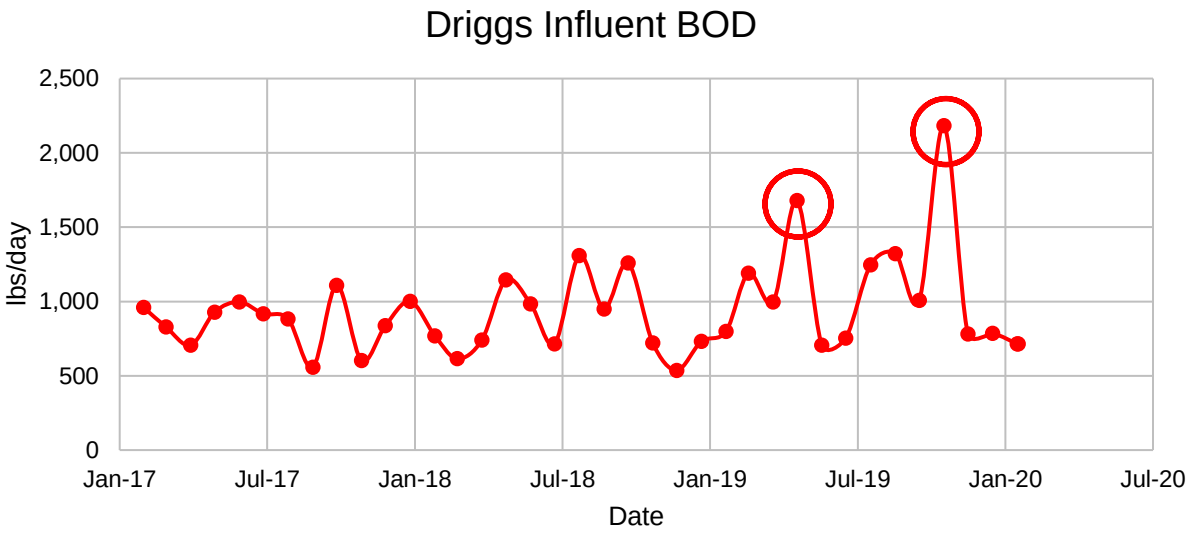


Looking at the hydraulic residence time in the MSABP basin, with the red line being the recommended 24-hour detention time (this assumes both basins in service)

The location of the composite sampler after the initial step screen and the drum screen does not provide a representative sample. It is suggested that the composite sampler be relocated into the step screen building. A hole could be bored through the wall to allow the sampler to sit into a heated space. This is strongly recommended to determine the actual loading into the facility.

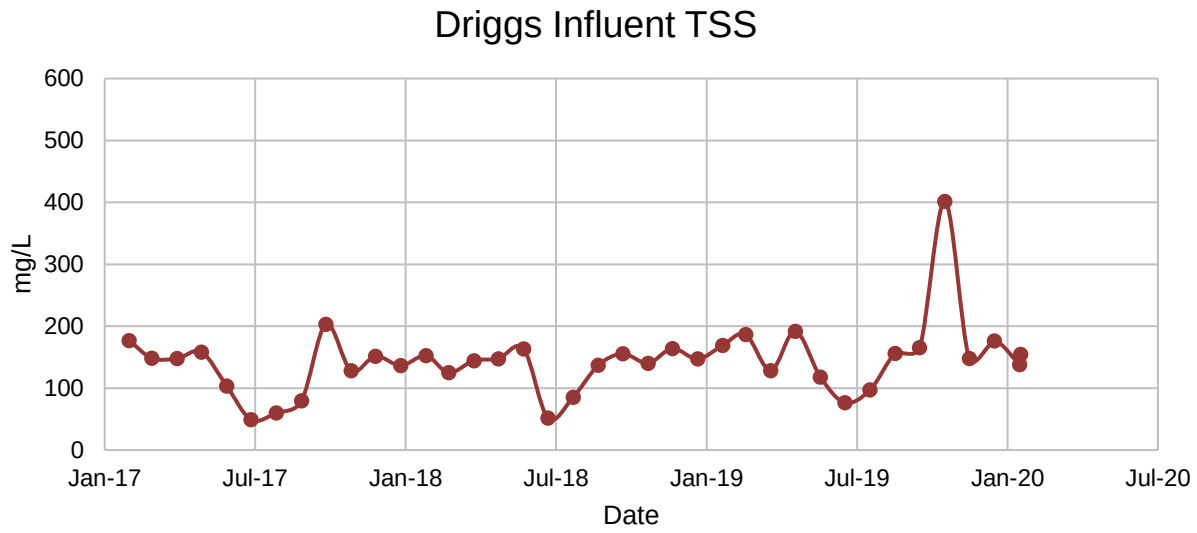


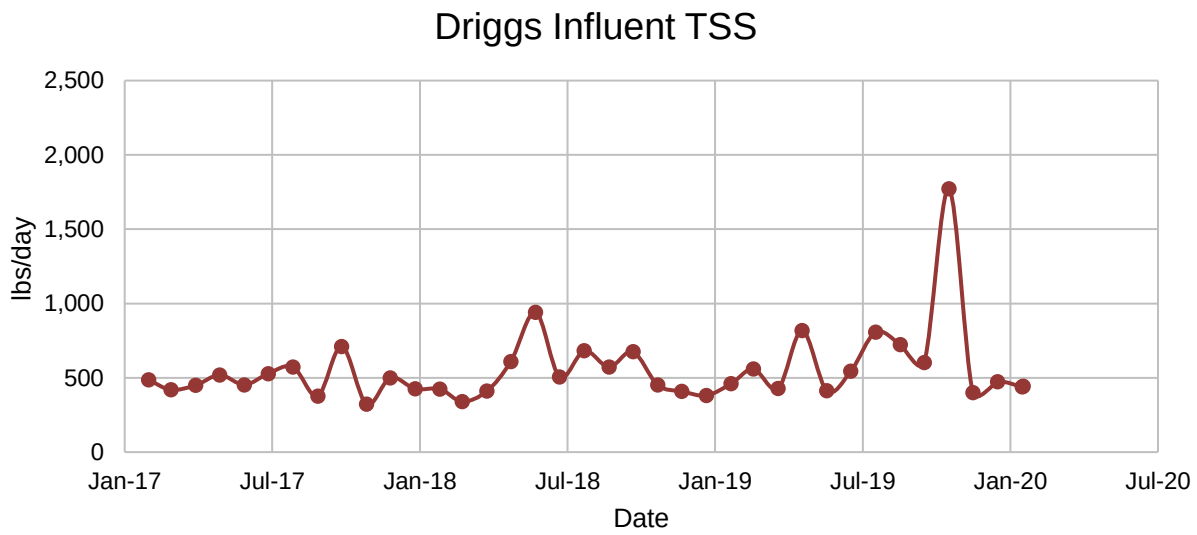
Looking at the loading reveals the impacts of the summer tourist season



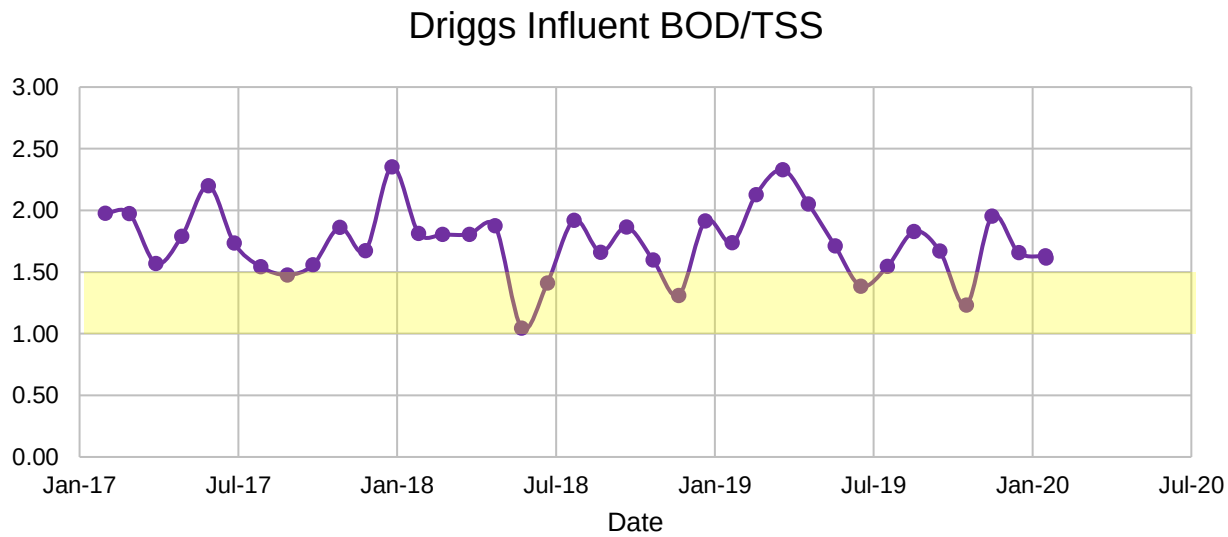
These peak loadings do correspond to effluent ammonia, which will be shown later.

Looking at the influent total suspended solids, and the impact of the sampler location

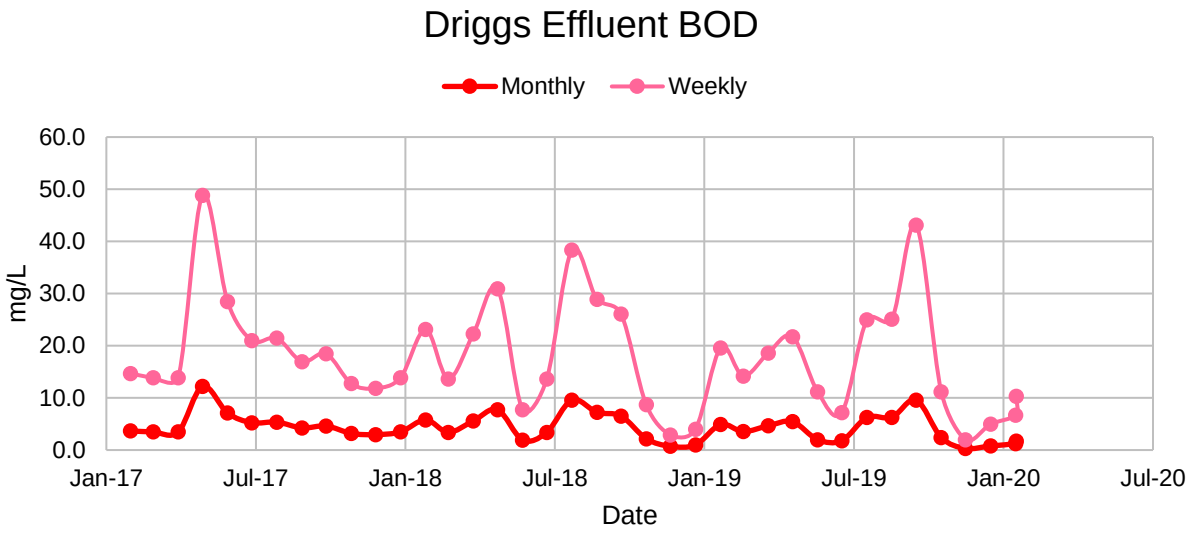


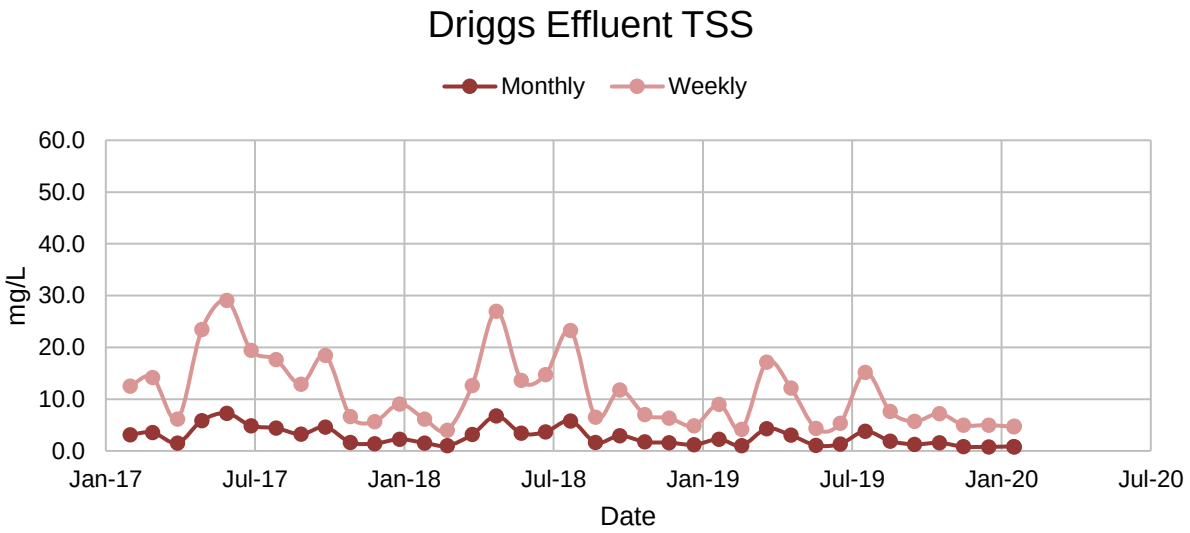


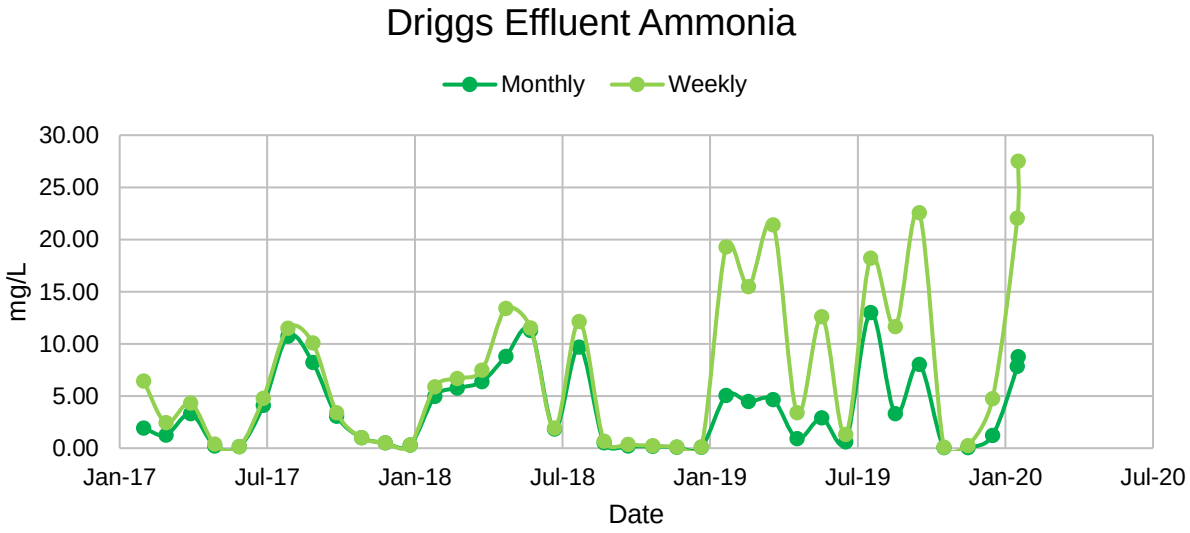
This is apparent from the BOD to TSS ratio, which would normally be from 1.0 – 1.5.



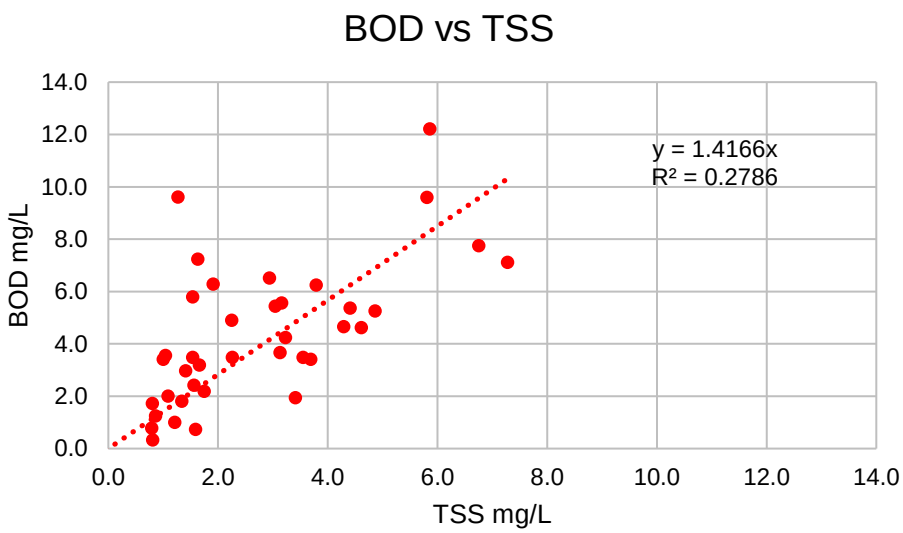
Looking at the effluent data



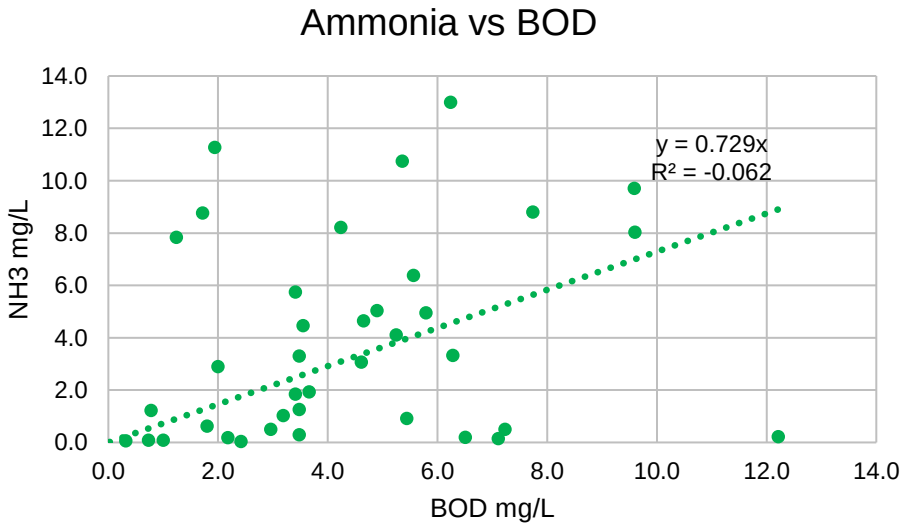


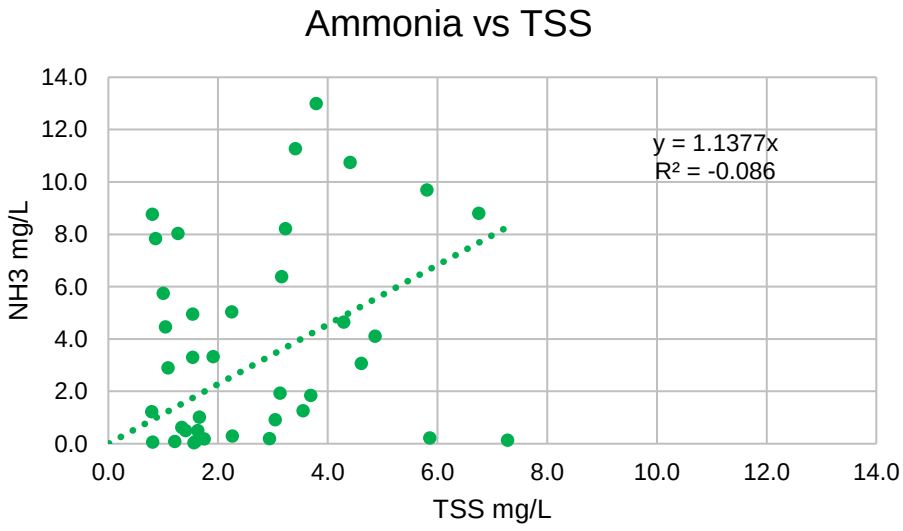


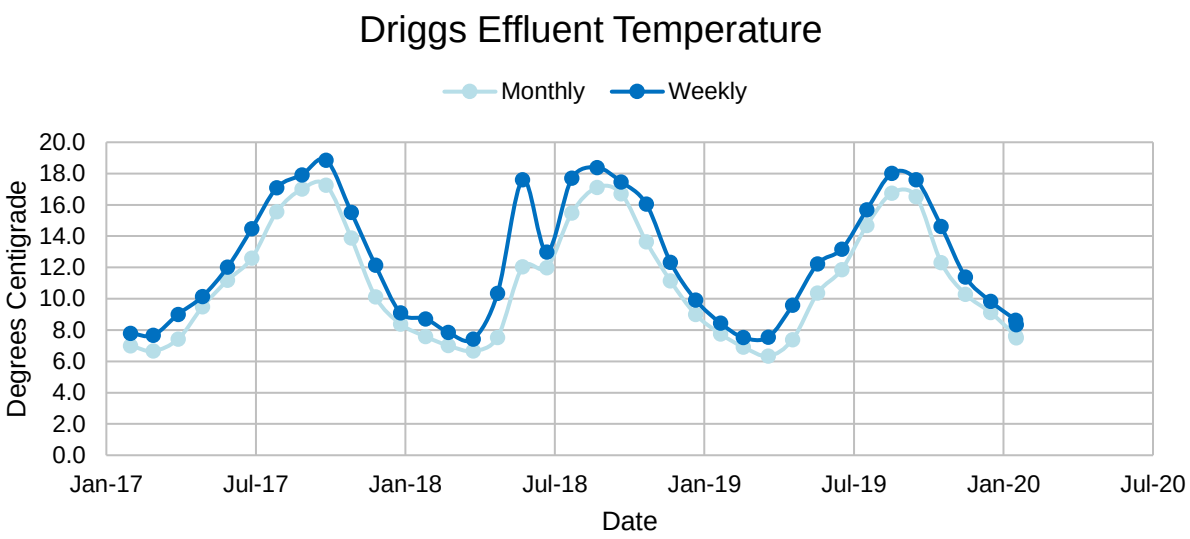
From the graphs below there is little relationship between BOD and TSS.



Even weaker for Ammonia to BOD or TSS

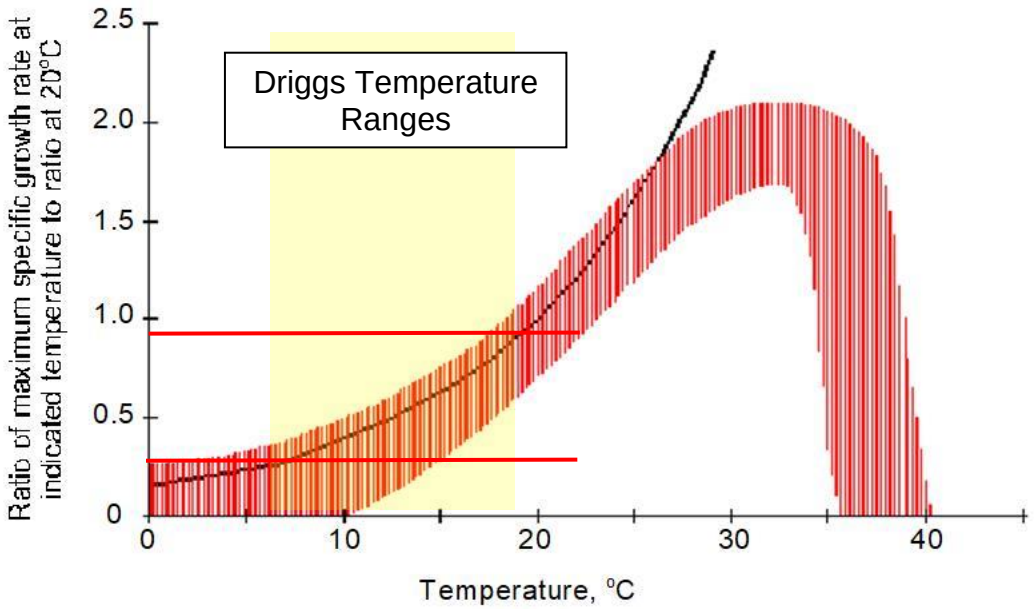




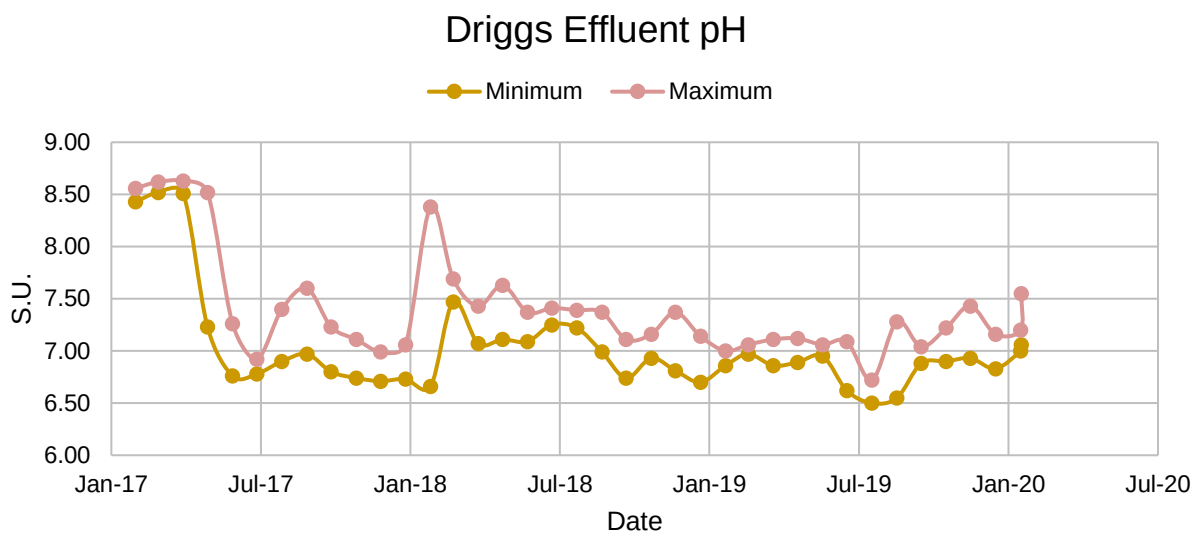


Note the dramatic dip in June 2018. This impact was seen in both the effluent BOD and ammonia.

Below is a graph of the impact of temperature on nitrification process.

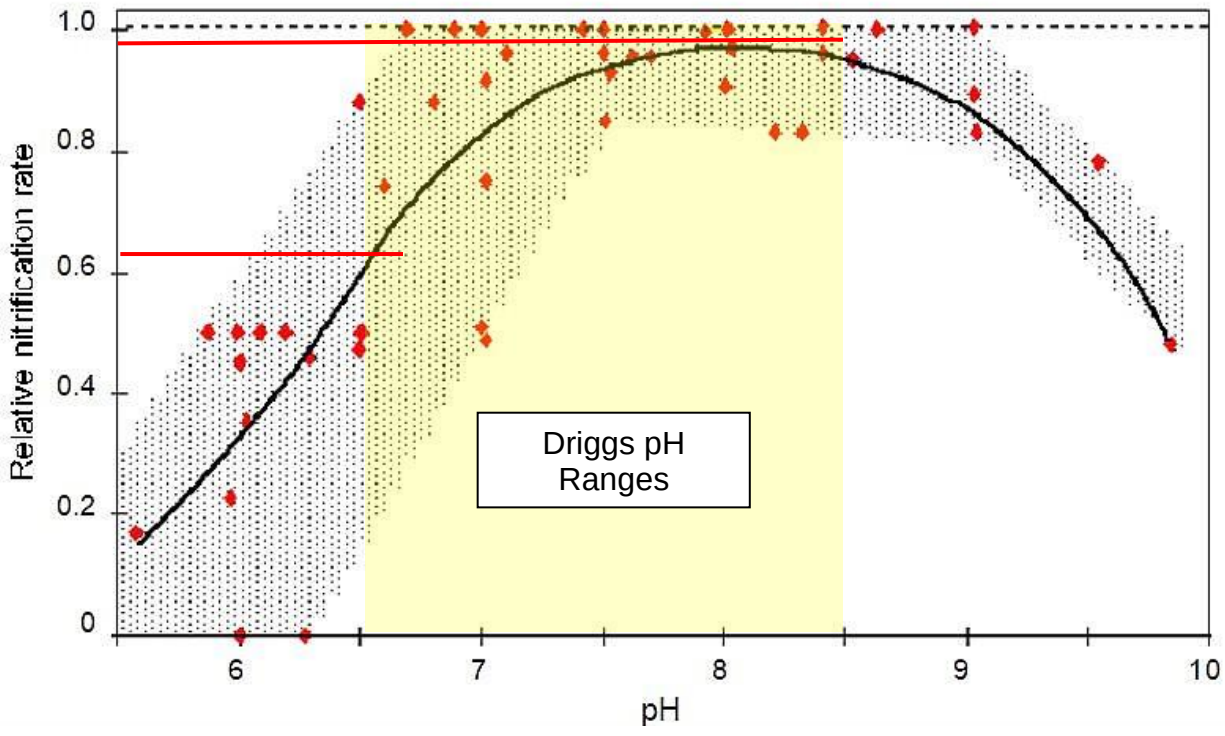


From this graph Driggs in the summer is around 85% efficient of a normalized nitrification rate. But the impact of the cold winter water decreases the nitrification rate to around 25%. This is compounded by the impacts of pH.



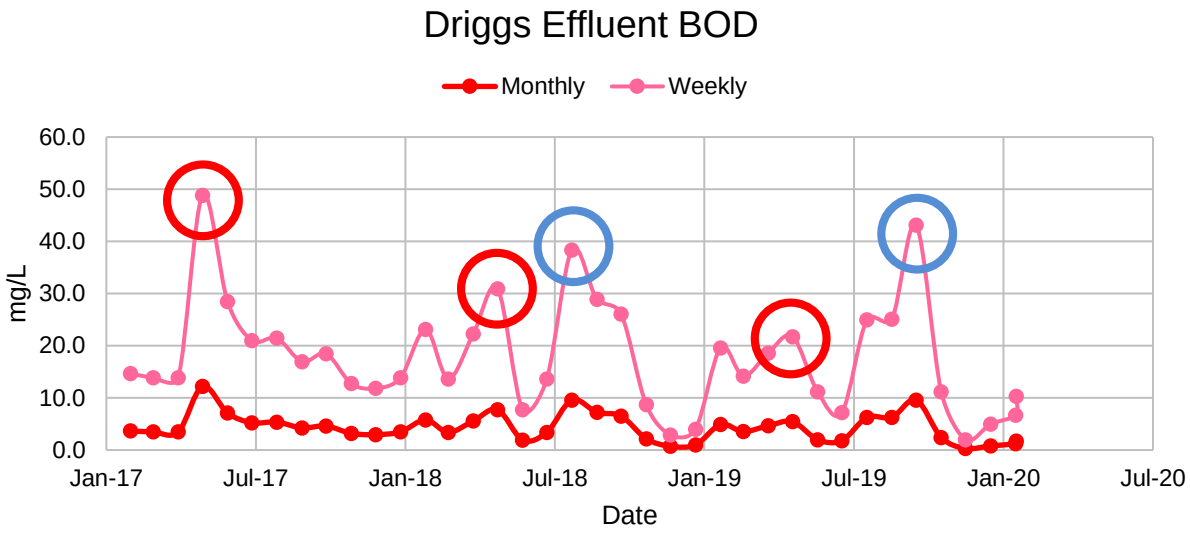
This graph is more concerning. The pH seems to be on a downward trend.

Below is a graph of the impact of pH nitrification process



From this graph Driggs in the summer is around 85% efficient of a normalized nitrification rate. But the impact of the cold winter water decreases the nitrification rate to around 25%. This is compounded by the impacts of pH.

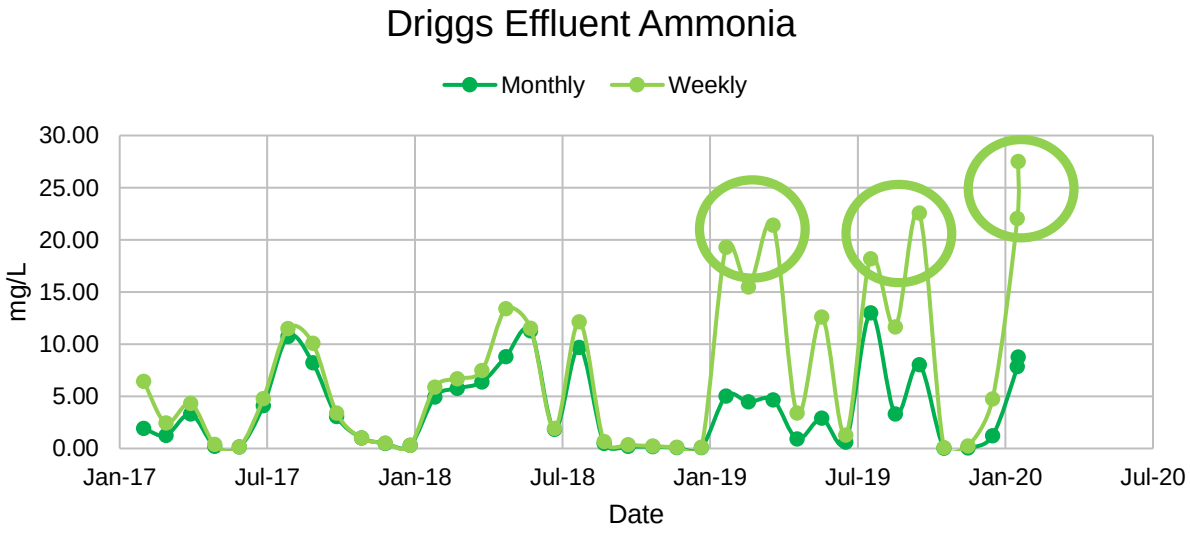
Looking at potential causes of non-compliance



The three peaks in red are during spring runoff, which is to be expected.

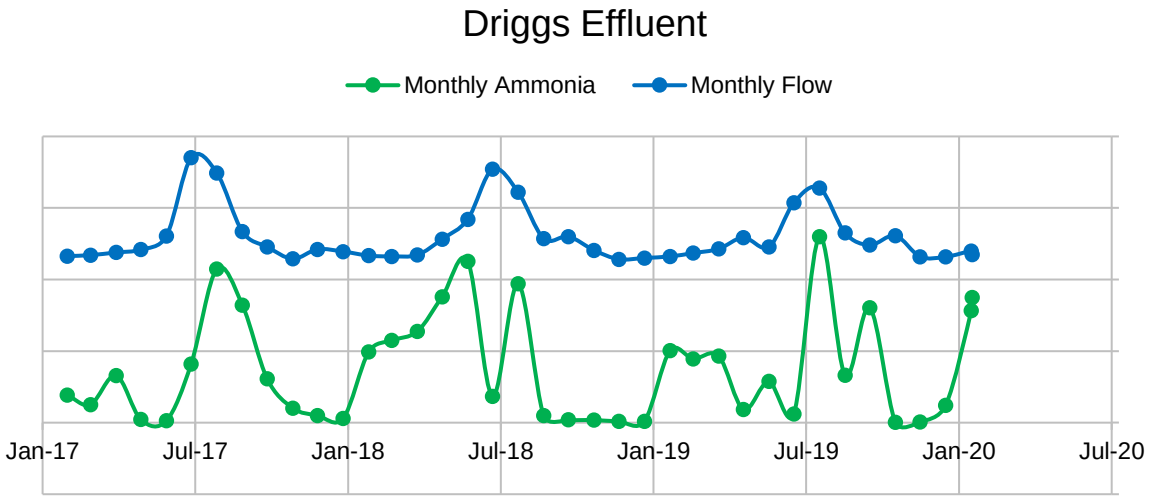
The first blue spike occurred after a 176 percent in organic (BOD) loading, and a weekly temperature fluctuation of 4 degrees. This would also be a natural outcome overloading the biology.

Unfortunately, I cannot explain the BOD spike in September 2019. (second blue ring)
I ran both linear and multi-variable regressions and could not find any correlations.

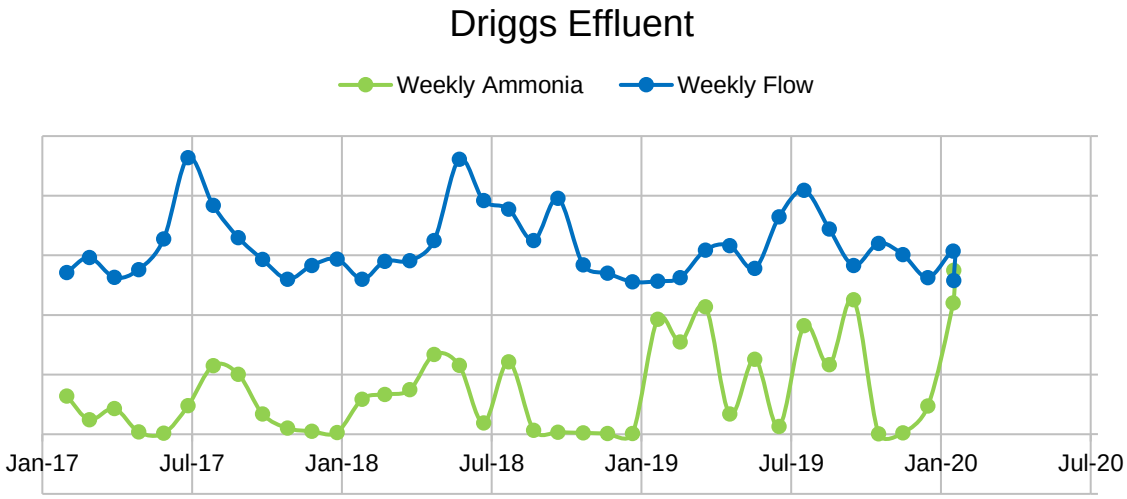


Initially the ammonia was following the flow rates, in the summer months. Presenting a mirror to the hydraulic retention times, lower HRT implies higher ammonia. Beginning in 2019 the weekly ammonia pattern seems to fall apart. (light green circles). This maybe a result of the lower pH or organic loading 2019

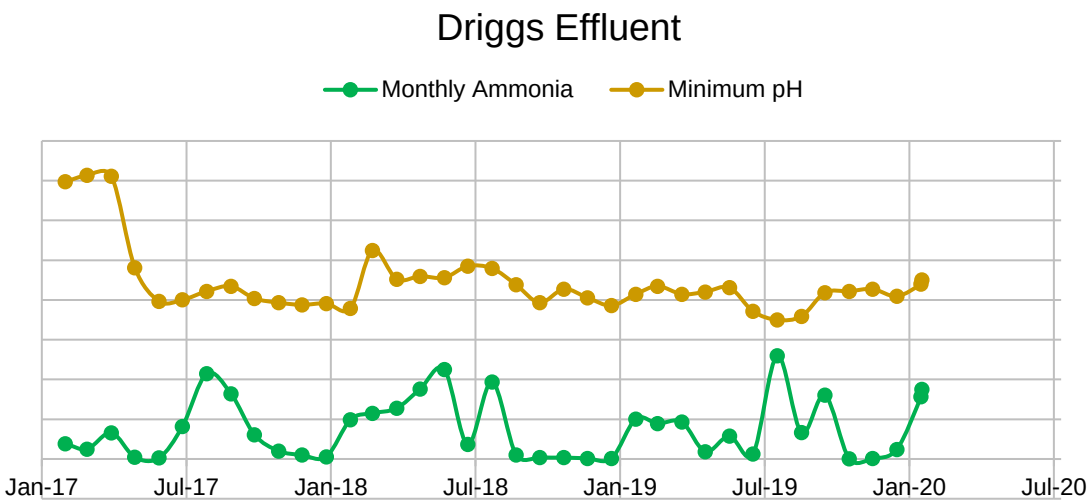
As shown below the monthly ammonia was following the monthly flow rate. Whereas the increasing variability in 2019 is quite clearly shown.



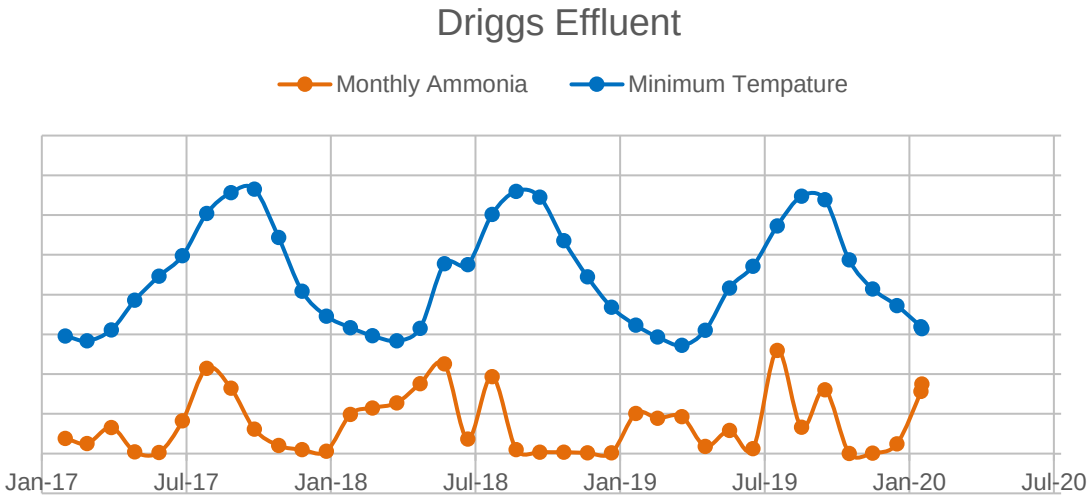
Looking at the weekly ammonia was following the weekly flow rate. Whereas the increasing variability in 2019 is quite clearly shown.



The ammonia spike in June 2019 does correspond to a dip in the pH which would be expected. Other than that, one point there is little correlation.



While temperature always impacts nitrification, there seems to be little correlation. In fact, just looking at the graph should higher peaks of ammonia during warmer temperatures. This is explained by the impact of the flow rates.

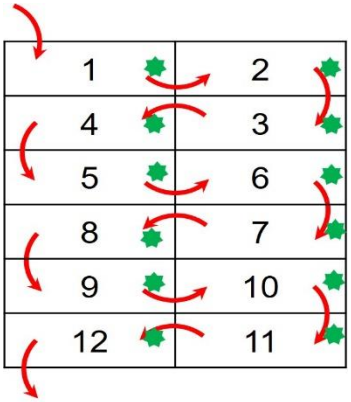


The cause(s) of poor nitrification performance is not readily apparent. Realistically it is probably the combined effects from BOD loadings, pH and temperature, Normally the results from the internal COD could possibly shed some light on this, but unfortunately after review Drigg's laboratory procedures, the COD data is highly suspect and should be considered invalid.

Physical Conditions at the time of visit

On March 5th, Wes Vann conducted a DO-pH Temperature profile of the east side MSABP basins. Thank you Wes!

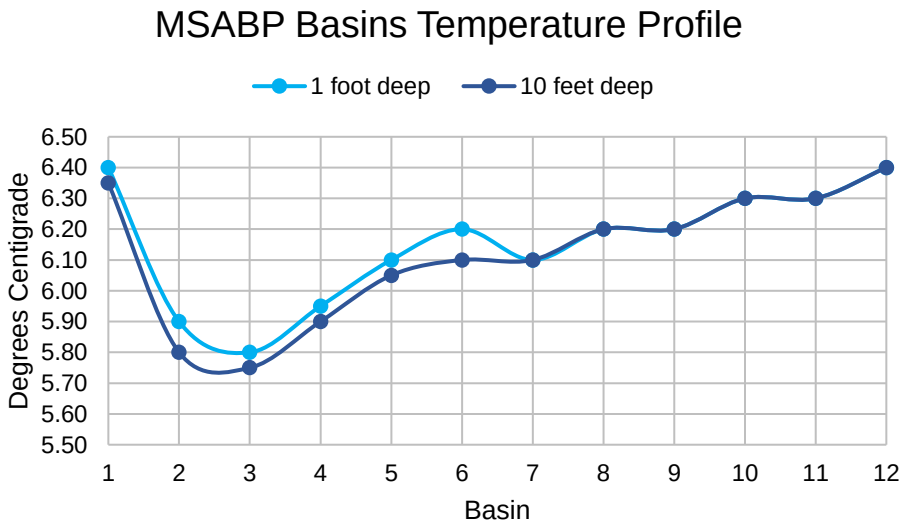
MASBP layout



Samples were taken 1 foot and 10 feet below the surface

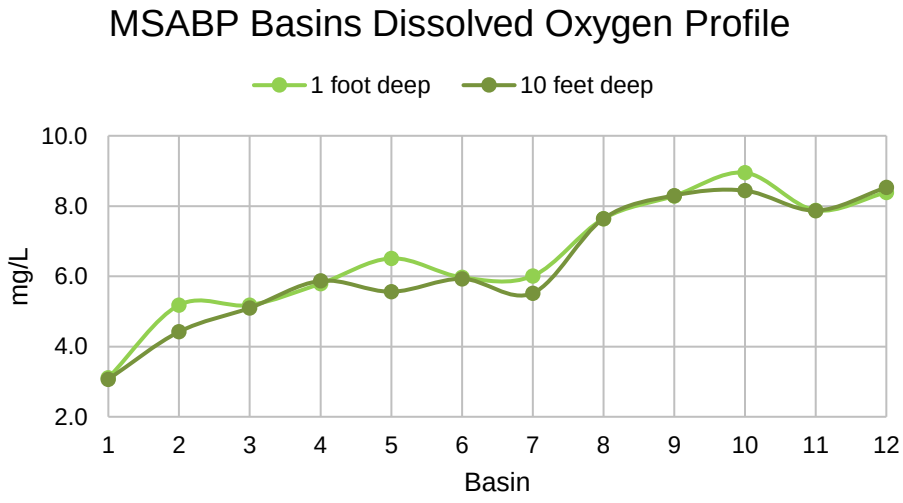
Samples were taken at the stared locations

Temperature Profile



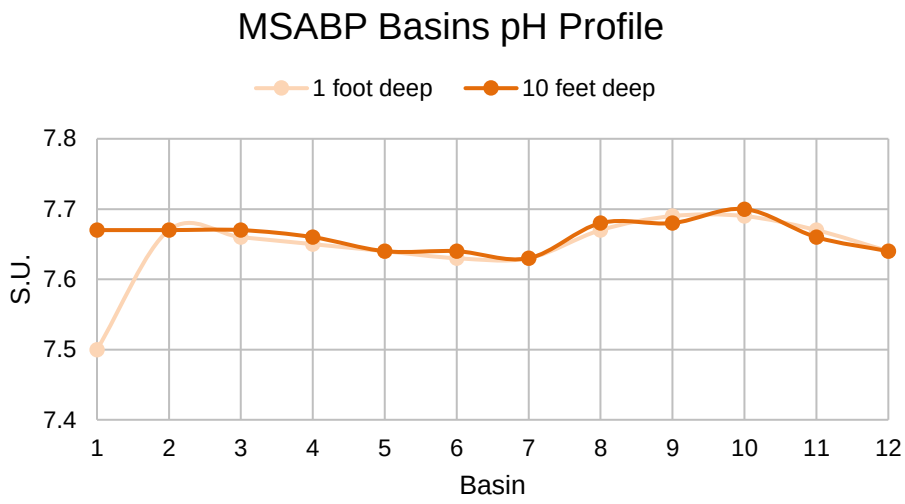
The variation between 1 and 10 feet could indicate incomplete mixing until basin 7.

Dissolved Oxygen Profile



The variation between 1 and 10 feet could indicate incomplete mixing.

pH Profile



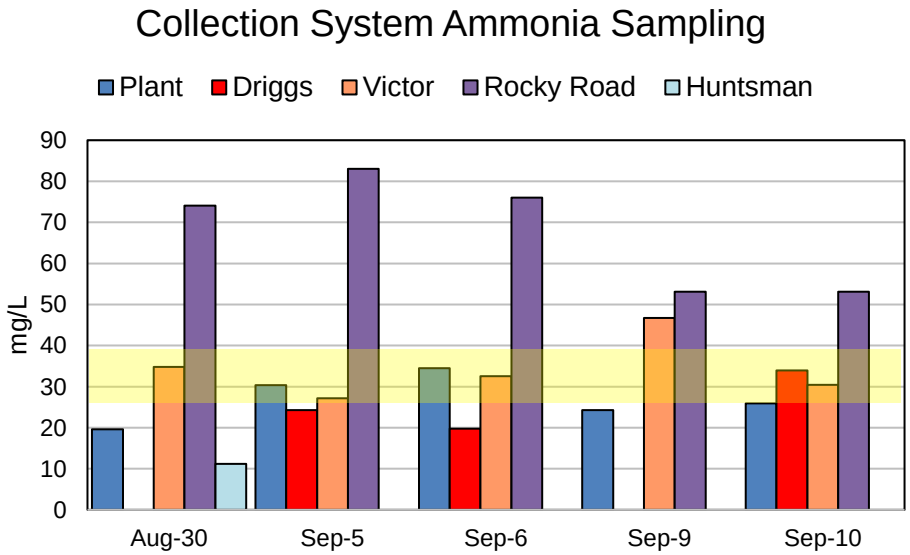
There is little variation in pH indicating good mixing except for basin 1.

So, given these profiles there could be some thermal stratification in the basins. The dissolved oxygen is more than enough, and the pH is enough to allow for nitrification.

Historic Collection System Sampling

From Aqua Engineering I was provide the following data
The collection system was sampled from August 30 to September 10, 2019. At the following locations

1. Plant Influent
2. Driggs Lift Station
3. Victor Lift Station
4. Rocky Road Lift Station
5. Huntsman Lift Station



25-40 mg/L is the normal domestic ranges

The lift station at Victor did have one higher ammonia reading, it is the lift station at Rocky Road that is of concern. The station at Rocky Road and all attached business and residents should be investigated. The ammonia at the Rocky Road lift station is double what would be expected from normal municipal wastes

Laboratory Procedures

In visiting Drigg's laboratory at the public works. I had the chance to briefly review the procedures used by the Drigg's wastewater staff. And have the following observations

1. Chemical Oxygen Demand – While the actual procedure is correct, apparently all the samples run in the past were not prepared correctly. When testing for chemical oxygen demand the sample must be homogenized. It is my understanding the none of the COD samples were historically homogenized. Not homogenizing any samples containing solids in a blender will yield artificially low results. This calls into question all of the COD sampling done in the collection system last year. A blender was purchased, and all COD samples are now properly prepared for testing.

2. E-coli - Driggs can run the IDEXX quanta tray 2000 e-coli method. When Tony, Wes and I tried to do a bit of hands-on training, the sealer would only run in reverse. I am thinking it's just a motion switch failure. I would suggest using the piece of equipment routinely in the future.

3. Suggested additional internal testing (weekly) –

    A. Alkalinity. While the pH appears to be more than sufficient to support nitrification, I would suggest checking the alkalinity to confirm sufficient substrate for the nitrifying bacteria.

    B. Influent Ammonia. While there was some limited data from the collection system sampling. I would recommend expand on the data to help with any further investigations.

    C. COD. COD will give the best information on potential impacts from industrial loadings.

I want to thank the operational staff (Tony Roy and Wes Vann) for their hospitality. Jared Gunderson and Scott Roger for addition information. I hope you found the visit and this memorandum helpful in improving the operation at the plant.